UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,511	10/28/2003	Kerim Kalafala	END920030067US1	6455

30449 7590 07/05/2007

SCHMEISER, OLSEN & WATTS
22 CENTURY HILL DRIVE
SUITE 302
LATHAM, NY 12110

EXAMINER	
MCFADDEN, MICHAEL B	

ART UNIT	PAPER NUMBER
2188	

MAIL DATE	DELIVERY MODE
07/05/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/696,511	KALAFALA ET AL.	
	Examiner	Art Unit	
	Michael B. McFadden	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/28/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The instant application having Application No. 10/696,511 has a total of 36 claims pending in the application; there are 4 independent claims and 32 dependent claims, all of which are ready for examination by the examiner.

I. INFORMATION CONCERNING OATH/DECLARATION

Oath/Declaration

2. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in 37 C.F.R. ' 1.63.

III. INFORMATION CONCERNING DRAWINGS

Drawings

3. The applicant's drawings submitted 28 October 2003 are acceptable for examination purposes.

IV. ACKNOWLEDGEMENT OF REFERENCES CITED BY APPLICANT

Information Disclosure Statement

4. As required by M.P.E.P. ' 609 (C), the applicant's submission of the Information Disclosure Statement dated 28 October 2003 is acknowledged by the examiner and the cited references have been considered in the examination of the claims now pending. As required by M.P.E.P. ' 609 C(2), a copy of the PTOL-1449 initialed and dated by the examiner is attached to the instant office action.

VI. REJECTIONS NOT BASED ON PRIOR ART

Claim Rejections – 35 USC ' 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 1-36 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims do not transform an article or physical object to a different state or thing and do not produce a concrete, tangible, and useful result. The claims are directed to an abstract mathematical idea. The claims are pure mathematical manipulation of data that are not believed to be tied to a practical application. However, in the event that the applicant believes that there is a practical application the claims are so broad and sweeping as to encompass every substantial practical application and thus preempt the abstract idea.

VII. REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC ' 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

8. Claims 1-36 are rejected under 35 U.S.C. 102(a) as being anticipated by Li et al. (("Process Variation Dimension Reduction Based on SVD") herein after Li).

9. **Regarding Claims 1 and 19,** Li discloses a method of partitioning the columns of a matrix A, said method comprising: providing the matrix A in a memory device of a computer system, said matrix A having n columns and m rows, n being an integer of at least 3, m being an integer of at least 1; and executing an algorithm by a processor of the computer system, said executing including partitioning the n columns of the matrix into a closed group of p clusters, p being a positive integer of at least 2 and less than n, said partitioning comprising an affinity-based merging of clusters of the matrix A, each said cluster consisting of one or more columns of said matrix A. **(Li: Section 2.1, 2.2, and 2.3. The Applicant has admitted on page 11, lines 1-6 states that Li has shown partitioning the columns of a matrix into p clusters.)**

10. **Regarding Claims 2 and 20,** Li discloses accepting p as an input to the algorithm. **(Li: Section 2.3.)**

11. **Regarding Claims 3, 13, 21, and 31,** Li discloses wherein the matrix A relates a vector x having n elements to a vector d having m elements in accordance with an equation of d = Ax, wherein the n elements of the vector x consist of n statistically independent variables, and wherein the m elements of the vector d consist of m dependent variables. **(Li: Section 2.2.)**

12. **Regarding Claims 4, 14, 22, and 31,** Li discloses computing a vector z having p statistically independent elements such that each of the p statistically independent elements is a linear combination of the n statistically independent variables; and computing an m x p matrix B from the p clusters of the matrix A such that Bz defines a new set of m dependent variables replacing Ax. **(Li: Section 2.1, 2.2, and 2.3. The**

Applicant has admitted on page 11, lines 1-6 states that Li teaches constructing the new coefficient matrix B and the new process variables z.)

13. **Regarding Claims 5, 15, 23, and 32,** Li discloses said n statistically independent variables representing non-Gaussian sources of variation. **(Li: Section 2.1, 2.2, and 2.3. The Applicant has admitted on page 10, line 19 – page 11, line 1 that Li teaches that the variables are statistically independent, even for non-Gaussian sources of variation.)**

14. **Regarding Claims 6, 16, 24, and 34,** Li discloses selecting the n statistically independent variables from N statistically independent variables such that N > n, said N variables consisting of said n variables and a remaining N - n statistically independent variables, said N- n variables representing Gaussian sources of variation. **(Li: Section 2.1, 2.2, and 2.3. The Applicant has admitted on page 10, line 19 – page 11, line 1 that Li teaches that the variables are statistically independent, even for non-Gaussian sources of variation.)**

15. **Regarding Claims 7, 17, 25, and 35,** Li discloses said m elements of the vector d denoting path slack variations in a semiconductor chip, said n statistically independent variables denoting sources of statistical error that linearly contribute to said path slack variations. **(Li: Abstract and Section 1.)**

16. **Regarding Claims 8, 18, 26, and 36,** Li discloses said sources of statistical error comprising statistical variations selected from the group consisting of statistical variations associated with processing the semiconductor chip, statistical variations associated with manufacturing the semiconductor chip, statistical variations associated

with operating the semiconductor chip, statistical variations associated with modeling the semiconductor chip, and statistical variations associated with uncertainties in material properties of the semiconductor chip. **(Li: Abstract and Section 1.)**

17. **Regarding Claims 9 and 27,** Li discloses a method of partitioning the columns of a matrix A, said method comprising executing an algorithm by a processor of a computer system, said executing including performing the steps of: generating a list of clusters having n clusters such that each of the n clusters consist of a unique column of the matrix A, said matrix A being stored in a memory device of the computer system, said matrix A having n columns and m rows, n being an integer of at least 3, m being an integer of at least 1, each said cluster consisting of one or more columns of said matrix A; determining if a termination condition is satisfied and if said determining so determines that said termination condition is satisfied then terminating said executing else performing the following steps: selecting a next pair of clusters from the list of clusters, said next pair of clusters consisting of a first cluster and a second cluster, said next pair of clusters having an affinity that is not less than an affinity between any pair of clusters not yet selected from the list of clusters; merging the first and second clusters to form a new cluster; inserting the new cluster into the list of clusters while removing the first and second clusters from the list of clusters; and re-executing said determining step. **(Li: Section 2.1, 2.2, and 2.3. The Applicant has admitted on page 11, lines 1-6 states that Li has shown partitioning the columns of a matrix into p clusters. Furthermore, in Section 2.3 Li teaches that the matrix manipulation and**

partitioning is repeated until A is empty, thereby defining and fulfilling a termination condition.)

18. **Regarding Claims 10 and 28,** Li discloses performing the step of accepting an input p to the algorithm, p being a positive integer of at least 2 and less than n, said termination condition being that a current number of clusters in the list of clusters is equal to p. **(Li: Section 2.3.)**

Claim Rejections - 35 USC ' 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

20. Claims 11, 12, 29, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (("Process Variation Dimension Reduction Based on SVD") herein after Li).

21. **Regarding Claims 11 and 29,** Li fails to disclose accepting an affinity threshold as an input to the algorithm; and if the affinity of the next pair of clusters selected in the selecting step is less than the affinity threshold then setting a flag indicating that the termination condition has been satisfied and again performing the determining step while not performing the inserting step. **(Li: Section 2.3. Li teaches that having a good partition method, and therefore affinity evaluation, is desirable in reducing**

error and then proceeds to give a desirable partition method. Therefore it would have been obvious to one of skill in the art at the time of the invention to include the use of an affinity threshold. The use of threshold values and a flag which trigger when those thresholds are reached is well known and commonly used. Therefore it would have been obvious to utilize an affinity threshold in order to produce desirable partitions.)

22. **Regarding Claims 12 and 30,** Li fails to disclose supplying a cluster error tolerance ε as an input to the algorithm; and if the selecting step results in the list of clusters having a cluster approximation error E such that E > ε then setting a flag indicating that the termination condition has been satisfied and x. again performing the determining step while not performing the inserting step. **(Li: Section 2.3. Li teaches that having a low error of approximation is desirable and teaches a method to provide an upper bound on error. Therefore it would have been obvious to one of skill in the art at the time of the invention to include the use of an error threshold. The use of threshold values and a flag which trigger when those thresholds are reached is well known and commonly used. Therefore it would have been obvious to utilize an error threshold in order to produce reduce error and ensure that the partitioning operations are performing as expected.)**

IX. CLOSING COMMENTS

Conclusion

a. STATUS OF CLAIMS IN THE APPLICATION

23. The following is a summary of the treatment and status of all claims in the application as recommended by M.P.E.P. ' 707.07(i):

a(4). CLAIMS REJECTED IN THE APPLICATION

24. Per the instant office action, claims 1-36 have received a first action on the merits and are subject of a first action non-final.

b. DIRECTION OF FUTURE CORRESPONDENCES

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. McFadden whose telephone number is (571)272-8013. The examiner can normally be reached on Monday-Friday 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sam Sough can be reached on (571)272-6799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

IMPORTANT NOTE

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MBM
06/20/2007

Kevin L. Ellis
Primary Examiner